

WHAT IS CLAIMED IS:

1. A resin-sealed type semiconductor device comprising:

5 a tub for supporting a semiconductor chip;

a sealing body formed by sealing said semiconductor chip with a resin;

a plurality of leads arranged around said tub and exposed to the face of said sealing body on the 10 semiconductor device mounting side; and

connecting members for connecting the surface electrodes of said semiconductor chip and the corresponding ones of said leads,

wherein the two widthwise edge portions of each 15 of said leads are formed of rounded faces, and wherein the mounted face of said lead including said rounded faces is protruded at its central portion from the face of said sealing body on said semiconductor device mounting side.

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2. A resin-sealed type semiconductor device comprising:

a tub for supporting a semiconductor chip;

25 a sealing body formed by sealing said semiconductor chip with a resin;

a plurality of leads made of a copper alloy,
arranged around said tub, exposed to the face of said
sealing body on the semiconductor device mounting
side, and having a plated layer on the portion which
5 is exposed from the face on said semiconductor device
mounting side; and

connecting members for connecting the surface
electrodes of said semiconductor chip and the
corresponding ones of said leads,

10 wherein the two widthwise edge portions of each
of said leads are formed of rounded faces, and wherein
the mounted face of said lead including said rounded
faces is protruded at its central portion from the
face of said sealing body on said semiconductor device
15 mounting side.

3. A method of manufacturing a resin-sealed type
semiconductor device, comprising the steps of:

20 preparing a lead frame in which a plurality of
leads are arranged around a tub for supporting a
semiconductor chip;

bonding said tub and said semiconductor chip;
connecting the surface electrodes of said
semiconductor chip and the corresponding ones of said
25 leads by connecting members;

forming a sealing body by resin-molding said semiconductor chip and said connecting members on said lead frame on the semiconductor chip arranging side, to arrange said plurality of leads on the face of the
5 semiconductor device mounting side;

exposing said plurality of leads by polishing the face of said sealing body on said semiconductor device mounting side; and

separating said plurality of leads from the
10 frame portion of said lead frame.

4. A method of manufacturing a resin-sealed type semiconductor device, comprising the steps of:

15 preparing a lead frame in which a plurality of leads are arranged around a tub for supporting a semiconductor chip;

bonding said tub and said semiconductor chip;
connecting the surface electrodes of said semiconductor chip and the corresponding ones of said
20 leads by connecting members;

forming a sealing body by resin-molding said semiconductor chip and said connecting members on said lead frame on the semiconductor chip arranging side, to arrange said plurality of leads and said tub on the
25 face of the semiconductor device mounting side with

the individual inner portions of the adjoining ones of
said leads being separated;

exposing said plurality of leads and said tub by
polishing the face of said sealing body on said
5 semiconductor device mounting side; and

separating said plurality of leads from the
frame portion of said lead frame.

5. A semiconductor device manufacturing method

10 according to Claim 3,

wherein said lead frame is made of a copper
alloy, and

wherein a plated layer is formed on the mounted
faces of said leads after the resin-molding step.

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6. A method of manufacturing a resin-sealed type
semiconductor device, comprising the steps of:

preparing a lead frame in which a plurality of
leads are arranged around a tub for supporting a
20 semiconductor chip;

bonding said tub and said semiconductor chip;
connecting the surface electrodes of said
semiconductor chip and the corresponding ones of said
leads by connecting members;

25 forming a sealing body by resin-molding said

semiconductor chip and said connecting members on said lead frame on the semiconductor chip arranging side, to arrange said plurality of leads on the face of the semiconductor device mounting side with the individual
5 inner portions of the adjoining ones of said leads being separated;

exposing said plurality of leads by polishing the face of said sealing body on said semiconductor device mounting side; and

10 cutting and separating said individual leads from the frame portion of said lead frame by pressing, after said lead frame is placed on a cutting die with the face of said sealing body on said semiconductor device mounting side being directed upward, said leads under pressure with the cutting blade of said cutting
15 die from the side of the mounted face of the leads.

7. A method of manufacturing a resin-sealed type semiconductor device, comprising the steps of:

20 preparing a lead frame which is made of a copper alloy and in which a plurality of leads are arranged around a tub for supporting a semiconductor chip; bonding said tub and said semiconductor chip; connecting the surface electrodes of said
25 semiconductor chip and the corresponding ones of said

leads by connecting members;

forming a sealing body by resin-molding said semiconductor chip and said connecting members on said lead frame on the semiconductor chip arranging side,

5 to arrange said plurality of leads on the face of the semiconductor device mounting side with the individual inner portions of the adjoining ones of said leads being separated;

10 exposing said plurality of leads by polishing the face of said sealing body on said semiconductor device mounting side;

forming a plated layer on the mounted faces of said leads, as exposed from the face on said semiconductor device mounting side; and

15 cutting and separating said individual leads from the frame portion of said lead frame by pressing, after said lead frame is placed on a cutting die with the face of said sealing body on said semiconductor device mounting side being directed upward, said leads 20 under pressure with the cutting blade of said cutting die from the side of the mounted face of the leads.

8. A semiconductor device manufacturing method according to Claim 3,

25 wherein the face of said sealing body on said

semiconductor device mounting side is polished with a brush which is made of a polyamide resin having abrasive grain thereon.

5 9. A method of manufacturing a resin-sealed type semiconductor device, comprising the steps of:

 preparing a lead frame in which a plurality of leads are arranged around a tub for supporting a semiconductor chip;

10 bonding said tub and said semiconductor chip;

 connecting the surface electrodes of said semiconductor chip and the corresponding ones of said leads by connecting members;

15 forming a sealing body by resin-molding said semiconductor chip and said connecting members on said lead frame on the semiconductor chip arranging side, to arrange said plurality of leads on the face of the semiconductor device mounting side with the individual inner portions of the adjoining ones of said leads

20 being separated;

 exposing said plurality of leads by polishing the face of said sealing body on said semiconductor device mounting side with a brush which is made of a polyamide resin having abrasive grain thereon; and

25 cutting and separating said individual leads

from the frame portion of said lead frame by pressing,
after said lead frame is placed on a cutting die with
the face of said sealing body on said semiconductor
device mounting side being directed upward, said leads
5 under pressure with the cutting blade of said cutting
die from the side of the mounted face of the leads.

10. A method of manufacturing a resin-sealed type
semiconductor device, comprising the steps of:

- 10 preparing a lead frame which is made of a copper
alloy and in which a plurality of leads are arranged
around a tub for supporting a semiconductor chip;
bonding said tub and said semiconductor chip;
connecting the surface electrodes of said
- 15 semiconductor chip and the corresponding ones of said
leads by connecting members;
- forming a sealing body by resin-molding said
semiconductor chip and said connecting members on said
lead frame on the semiconductor chip arranging side,
- 20 to arrange said plurality of leads on the face of the
semiconductor device mounting side with the individual
inner portions of the adjoining ones of said leads
being separated;
- exposing said plurality of leads by polishing
25 the face of said sealing body on said semiconductor

device mounting side with a brush which is made of a polyamide resin having abrasive grain thereon;

forming a plated layer on the mounted faces of said leads, as exposed from the face on said

5 semiconductor device mounting side; and

separating said plurality of leads from the frame portion of said lead frame.

11. A method of manufacturing a resin-sealed type

10 semiconductor device, comprising the steps of:

preparing a lead frame which is made of a copper alloy and in which a plurality of leads are arranged around a tub for supporting a semiconductor chip;

bonding said tub and said semiconductor chip;

15 connecting the surface electrodes of said

semiconductor chip and the corresponding ones of said leads by connecting members;

forming a sealing body by resin-molding said semiconductor chip and said wires on said lead frame
20 on the semiconductor chip arranging side, to arrange said plurality of leads on the face of the semiconductor device mounting side with the individual inner portions of the adjoining ones of said leads being separated;

25 exposing said plurality of leads by polishing

the face of said sealing body on said semiconductor device mounting side with a brush which is made of a polyamide resin having abrasive grain thereon;

5 forming a plated layer on the mounted faces of
said leads, as exposed from the face on said
semiconductor device mounting side; and

10 cutting and separating said individual leads
from the frame portion of said lead frame by pressing,
after said lead frame is placed on a cutting die with
the face of said sealing body on said semiconductor
device mounting side being directed upward, said leads
under pressure with the cutting blade of said cutting
die from the side of the mounted face of the leads.

15 12. A method of manufacturing a resin-sealed type
semiconductor device, comprising the steps of:

preparing a lead frame which is made of a copper
alloy and in which a plurality of leads are arranged
around a tub for supporting a semiconductor chip;

20 bonding said tub and said semiconductor chip;

connecting the surface electrodes of said
semiconductor chip and the corresponding ones of said
leads by bonding wires;

25 forming a sealing body by resin-molding said
semiconductor chip and said connecting members on said

lead frame on the semiconductor chip arranging side,
to arrange said plurality of leads on the face of the
semiconductor device mounting side with the individual
inner portions of the adjoining ones of said leads

5 being separated;

exposing said plurality of leads by polishing
the face of said sealing body on said semiconductor
device mounting side with a brush which is made of a
polyamide resin having abrasive grain thereon;

10 forming a soldered layer on the mounted faces of
said leads, as exposed from the face on said
semiconductor device mounting side; and

cutting and separating said individual leads
from the frame portion of said lead frame by pressing,
15 after said lead frame is placed on a cutting die with
the face of said sealing body on said semiconductor
device mounting side being directed upward, said leads
under pressure with the cutting blade of said cutting
die from the side of the mounted face of the leads.

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13. A method of manufacturing a resin-sealed type
semiconductor device, comprising the steps of:

preparing a lead frame in which a plurality of
leads are arranged around a tub for supporting a
25 semiconductor chip;

bonding said tub and said semiconductor chip;
connecting the surface electrodes of said
semiconductor chip and the corresponding ones of said
leads by connecting members;

5 forming a sealing body by resin-molding said
semiconductor chip and said connecting members on said
lead frame on the semiconductor chip arranging side,
to arrange said plurality of leads on the face of the
semiconductor device mounting side with the individual
10 inner portions of the adjoining ones of said leads
being separated;

exposing said plurality of leads by polishing
the face of said sealing body on said semiconductor
device mounting side at an abrasion rate according to
15 a warpage of said face with a brush which is made of a
polyamide resin having abrasive grain thereon; and
separating said plurality of leads from the
frame portion of said lead frame.

20 14. A method of manufacturing a resin-sealed type
semiconductor device, comprising the steps of:

preparing a lead frame in which a plurality of
leads are arranged around a tub for supporting a
semiconductor chip;

25 bonding said tub and said semiconductor chip;

connecting the surface electrodes of said semiconductor chip and the corresponding ones of said leads by connecting members;

forming a sealing body by resin-molding said
5 semiconductor chip and said connecting members on said lead frame on the semiconductor chip arranging side, to arrange said plurality of leads on the face of the semiconductor device mounting side with the individual inner portions of the adjoining ones of said leads
10 being separated;

forming the two widthwise edge portions of each of said leads into rounded faces and protruding the central portion of the mounted face, as including said rounded faces, of said lead from the face of said
15 sealing body on said semiconductor device mounting side by polishing the face of said sealing body on said semiconductor device mounting side with a brush which is made of a polyamide resin having abrasive grain thereon; and

20 separating said plurality of leads from the frame portion of said lead frame.

15. A method of manufacturing a resin-sealed type semiconductor device, comprising the steps of:

25 preparing a lead frame in which a plurality of

leads are arranged around a tub for supporting a semiconductor chip;

bonding said tub and said semiconductor chip;

connecting the surface electrodes of said

- 5 semiconductor chip and the corresponding ones of said leads by connecting members;

forming a sealing body by resin-molding said semiconductor chip and said connecting members on said lead frame on the semiconductor chip arranging side,

- 10 to arrange said plurality of leads on the face of the semiconductor device mounting side;

cutting and separating said individual leads from the frame portion of said lead frame by pressing, after said lead frame is placed on a cutting die with

- 15 the face of said sealing body on said semiconductor device mounting side being directed upward, said leads under pressure with the cutting blade of said cutting die from the side of the mounted face of the leads.